

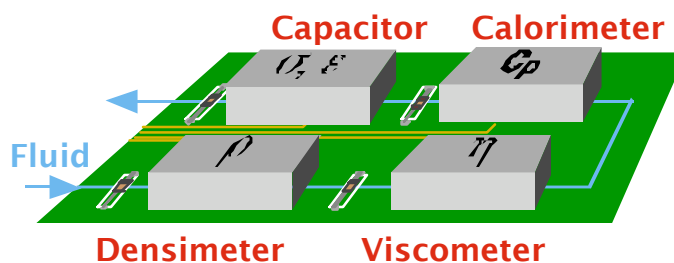
Fluid properties microanalysis

- Critical Issues

- High throughput screening and combi-chemistry generate a myriad of new compounds whose thermophysical properties (density, heat capacity, viscosity, dielectric constant etc.) cannot be measured at the production rate with conventional techniques. Massive reduction of measurement time is required.
- Besides measuring all properties of a few fluids over wide ranges of pressure and temperature, measure selected key properties of many fluids and mixtures at ambient pressure and temperature → combinatorial approach.

- Research Strategy

- Reduce sample size to speed up measurements. Initial target volume is 50 μL . Reduction by factor of 60 from smallest samples presently required.
- Develop continuous-flow microsensors for properties measurements on small sample volumes. Most conventional methods use static sample batches.
- Focus on a profile of key properties: density, vapor pressure/heat of vaporization, specific heat capacity, viscosity, electrical conductivity and permittivity. For mixtures, include heat of mixing and volume of mixing measurements.
- Microsensors for thermophysical properties of fluids have enormous market potential, e. g. *in vivo* viscosity measurements of blood.
- Combine microsensors into high-throughput continuous-flow thermophysical properties analyzer for serial measurements of the key properties on the same sample. Analyzer will have the size of a digital voltmeter combined with a laptop computer.
- Connect analyzer in series with high-throughput reaction screening and mixture preparation units.
- Harvest thermophysical properties data from combinatorially synthesized compounds to create properties libraries for the development of quantitative structure-properties relationships (QSPR).



Conceptualization of a continuous flow arrangement of thermophysical properties microsensors.

For more information ...